CLAIMS

1. A method for manufacturing a cylindrical ring with beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

the molding face of the metal mold is substantially symmetrical with respect to a plane vertical to the axial direction at the central position of the axial direction.

2. The method for manufacturing the cylindrical ring with the beads according to Claim 1, wherein

the central position of the base ring in the axial direction corresponds to that of the metal mold in the axial direction.

3. A method for manufacturing a cylindrical ring with beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

the grooves on the metal mold have holes communicating with the exterior of the grooves.

4. A method for manufacturing a cylindrical ring with

beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

the metal mold comprises a plurality of pieces separable in the circumferential direction.

5. A method for manufacturing a cylindrical ring with beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the

beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

the metal mold comprises a plurality of mold segments separable in the axial direction at the grooves; and

a gap is provided between two adjacent mold segments in the axial direction.

6. A method for manufacturing a cylindrical ring with beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the

opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

an inner roll and an outer roll of which outer dimensions are finished with a required accuracy are prepared; and

the cylindrical ring with the beads molded into the shape corresponding to the molding face by electromagnetic forming is corrected by rotating the rolls while interposing the cylindrical ring between the inner roll and the outer roll.

7. A method for manufacturing a cylindrical ring with beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

the step of applying the momentary large current to the coil is repeated a plurality number of times.

8. A method for manufacturing a cylindrical ring with beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

the metal mold has a circular cutting blade vertical to the axial direction; and

the cutting blade cuts the base ring when the base ring is pressed toward the molding face of the metal mold.

9. The method for manufacturing the cylindrical ring with the beads according to Claim 6, wherein

at least one of the inner roll and the outer roll has a cutting blade; and

the cutting blade cuts the cylindrical ring with the beads when the cylindrical ring with the beads is pressed toward the roll having the cutting blade.

10. A method for manufacturing a cylindrical ring with beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

the base ring has a large number of holes in the circumferential wall.

11. The method for manufacturing the cylindrical ring with the beads according to Claim 10, wherein

the large number of holes are formed in the base ring along the circumferential direction at positions where portions of the base ring enter the interior of the grooves from the exterior of the grooves of the molding face of the metal mold in electromagnetic forming.

12. The method for manufacturing the cylindrical ring with the beads according to Claim 10, wherein

the large number of holes are formed in the base ring along the circumferential direction at both end portions of the base ring in the axial direction.

13. A method for manufacturing a cylindrical ring with beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

a large number of projections are formed in the molding face of the metal mold along the circumferential direction at positions nearest to the base ring;

a large number of holes are formed in the base ring along the circumferential direction at positions corresponding to the projections; and

the projections are fitted into the holes when the

metal mold is put in position.

14. The method for manufacturing the cylindrical ring with the beads according to Claim 13, wherein

the projections are formed between two adjacent grooves on the molding face at the central position of the molding face of the metal mold in the axial direction; and

the holes are formed at the central position of the base ring in the axial direction.

15. A method for manufacturing a cylindrical ring with beads, comprising the steps of:

disposing a metal mold adjacent to the outer circumference or the inner circumference of a closed metallic base ring, the metal mold having a molding face that faces the base ring and having grooves for forming the beads on the molding face along the circumferential direction;

disposing a coil for electromagnetic forming at the opposite side of the metal mold such that the base ring is interposed therebetween;

applying a momentary large current to the coil in this arrangement; and

deforming the base ring by pressing the base ring toward the molding face of the metal mold such that the base

ring is molded into a shape corresponding to the molding face by electromagnetic forming, wherein

the base ring is in contact with the molding face of the metal mold at the central position of the molding face of the metal mold in the axial direction.

16. A metal mold for molding a cylindrical ring with beads by electromagnetic forming, comprising:

a ring-shaped molding face on the inner surface or the outer surface; and

grooves for forming the beads on the molding face along the circumferential direction, wherein

the metal mold has holes in the grooves communicating with the exterior of the grooves.

17. A metal mold for molding a cylindrical ring with beads by electromagnetic forming, comprising:

a ring-shaped molding face on the inner surface or the outer surface; and

grooves for forming the beads on the molding face along the circumferential direction, wherein

the metal mold comprises a plurality of pieces separable in the circumferential direction of the molding face.

18. A metal mold for molding a cylindrical ring with beads by electromagnetic forming, comprising:

a ring-shaped molding face on the inner surface or the outer surface; and

grooves for forming the beads on the molding face along the circumferential direction, wherein

the metal mold comprises a plurality of mold segments separable in the axial direction of the molding face at the grooves; and

a gap is provided between two adjacent mold segments in the axial direction of the molding face.

19. A metal mold for molding a cylindrical ring with beads by electromagnetic forming, comprising:

a ring-shaped molding face on the inner surface or the outer surface; and

grooves for forming the beads on the molding face along the circumferential direction, wherein

the metal mold has a circular cutting blade vertical to the axial direction of the molding face.

20. A metal mold for molding a cylindrical ring with beads by electromagnetic forming, comprising:

a ring-shaped molding face on the inner surface or the outer surface; and

grooves for forming the beads on the molding face along the circumferential direction, wherein

the metal mold further has a large number of positioning projections on the molding face along the circumferential direction at positions nearest to the base ring to be molded.

21. A metal mold for molding a cylindrical ring with beads by electromagnetic forming, comprising:

a ring-shaped molding face on the inner surface or the outer surface; and

grooves for forming the beads on the molding face along the circumferential direction, wherein

the metal mold protrudes to the maximum at the central position of the molding face in the axial direction.